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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/477,910	01/05/2000	PATRIK LARSSON	LARSSON-20-1	9899

7590 11/18/2003

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EXAMINER
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JAMAL, ALEXANDER

ART UNIT	PAPER NUMBER
2643	6

DATE MAILED: 11/18/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

09/477,910

Applicant(s)

LARSSON ET AL.

Examiner

Alexander Jamal

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 10 September 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☐ Claim(s) \_\_\_\_\_ is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 19-22 is/are allowed.
- 6) ☒ Claim(s) 1-18 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. §§ 119 and 120**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some \* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
\* See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.  
a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

**Attachment(s)**

- 1) ☐ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_ 6) ☐ Other: \_\_\_\_\_

## DETAILED ACTION

### *Claim Rejections - 35 USC § 103*

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. **Claims 1-12, 16 and 17** are rejected under 35 U.S.C. 103(a) as being unpatentable over Crochiere et al. (5664011), and further in view of Golla et al. (5724395).

a. **Claim 1:** Crochiere describes an echo canceller (which would also cancel out near-end-crosstalk) comprising:

- 1) A first FIR filter (Fig. 2, reference 128)
- 4) A means to subtract the filtered output signal from the original input signal (Fig. 1 and Col. 3, paragraph 8).

However Cochiere does not mention:

- 2) A second FIR filter
- 3) Means to partition the input data signal such that a portion of the input signal is processed by each FIR filter and the second portion of processed data (processed by the second FIR) has a larger data size than the first portion of processed data (processed by the first FIR).

Golla teaches that using a single higher resolution filter requires more memory (which requires more power), and more integrated circuit space (Col 1, paragraph. 4-5).

In order to help solve these problems Golla teaches the use of two smaller resolution FIR filters in which a data word is partitioned and a most-significant-bit portion is filtered by one FIR filter, and the remaining least-significant-bits are filtered by the second FIR filter (Fig. 3, Col.4, lines 49-58). Golla shows an additional embodiment of his teachings in which a second FIR filter 2 (Fig. 4) processes a second portion of the partitioned data signal (  $XM(n)$  ) comprising A0-A7 and B0-B7 that has a data size greater than the first portion of partitioned data (  $XL(n)$  ) that is processed by a first FIR filter (Col 4 lines 58-64). In view of Golla, it would have been obvious to one skilled in the art to apply Golla's solution when faced with the problems of higher resolution filters taking up too much space and drawing too much power, for the purpose of reducing the size and power draw of the circuitry. In view of Golla's solution applied to Cochiere's design it would have been obvious to add:

2) A second FIR filter

3) Means to partition the input data signal such that a portion of the input signal is processed by each FIR filter and the second portion of processed data (processed by the second FIR) has a larger data size than the first portion of processed data (processed by the first FIR).

b. **Claim 2:** Crochiere mentions an adaptable filter (Col. 1 paragraph 5) that is able to adjust its filter output values by adjusting its filter coefficients based on an error signal.

c. **Claim 3:** Golla's solution comprises two separate integrated circuits (Figs. 1-4).

- d. **Claims: 4 and 5:** Crochiere's echo canceller has an FIR filter containing a plurality of registers (filter elements).
  - e. **Claim 6:** Golla's solution claims a plurality of processors arranged in parallel and coupled to the means for splitting the input signal such that each portion of the partitioned input signal is sent to a separate processor (Golla's Claim 5).
  - f. **Claim 7:** Golla's solution describes that the input signal partition separates the most significant bits and the least significant bits. (Fig. 3 and Col 4, lines 49-58).
  - g. **Claims 8 and 9:** Crochiere describes subtracting the filtered signal from the original input signal (Abstract). With Golla's solution in mind, it would be obvious to subtract each separate filtered partition from the original input signal.
  - h. **Claims 10 and 11:** Crochiere's device includes both an adaptive and non-adaptive filter, with both filters being used to remove portions of an echo signal. When applying Golla's solution it would be obvious that either adaptive or non-adaptive filters could be used in the dual filter configuration.
  - i. **Claim 12:** Both Crochiere and Golla mention the use of digital filters.
  - j. **Claims 16 and 17:** Crochiere's device includes taps, delay lines and registers (Fig. 3 and Col. 6) in order to vary the output values of a filter.
3. **Claims 13-15** are rejected under 35 U.S.C. 103(a) as being unpatentable over Crochiere et al. (5664011) and Golla et al. (5724395) as applied to claim 1, and further in view of Maulik et al. (6260053). Crochiere and Golla describe applicant's claim 1, but do not mention the use of:
- a. using both FIR filters in direct-form

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- b. using both FIR filters in transpose-form
- c. using one FIR filter in direct form and the other in transpose form

Maulik teaches that a scalable filter architecture can be implemented in transpose form, and that a scalable filter architecture allows parallel and distributed processing (Col 3, lines 40-53). Maulik also teaches that the transfer function of a direct form filter is identical to that of a transpose form of the filter (Figs. 4-5 Col 6, line 53 to Col. 7 line 26). It would have been obvious to one skilled in the art, that two FIR filters, used to process distributed data could each be configured in any combination of direct or transpose-form in order to perform their function.

6. **Claim 18** rejected under 35 U.S.C. 103(a) as being unpatentable over Crochiere et al. (5664011) and Golla et al. (5724395) as applied to claim 1, and further in view of Walker et al. (5570423). Crochiere and Golla describe applicant's claim 1, but do not specify using either fixed or floating-point numbers in the filters. Walker teaches that fixed-point numbers may be used in an FIR filter used in an echo canceller circuit. He also teaches that the same gain can be achieved with a less-expensive fixed-point FIR filter as with a more expensive floating point FIR filter. (Col. 9, line 64 – Col. 10, line 13). It would have been obvious to one skilled in the art that fixed-point numbers could be used when implementing the FIR filters in order to provide a more cost effective solution.

***Allowable Subject Matter***

7. The following is a statement of reasons for the indication of allowable subject matter:

The Prior art of record (Golla, Maulik, Walker, Crochiere) fails to teach:

**a. Claim 19:** A method for partitioning data words in an echo/near-end-crosstalk cancellation circuit for a communications system, comprising the steps of:

determining a first bit resolution from a predetermined number of a plurality of echo/near-end-crosstalk (E/N) signals having a lowest amplitude;

determining a second bit resolution by subtracting the first bit resolution from a bit resolution of a single signal from a plurality of E/N signals having a highest amplitude; and

partitioning the plurality of E/N signals such that a first portion is processed by a first FIR filter having a data path identical to the first bit resolution, and a second portion comprised of bits having a data size exceeding the bit width of the first FIR filter is processed by a second FIR filter having a data path identical to the second bit resolution.

**b. Claim 22:** A method for partitioning a data signal, comprising the steps of:

determining from a plurality of echo/near-end-crosstalk (E/N) signals a maximum bit resolution associated with a single signal having a highest amplitude;

selecting a first FIR filter and a second FIR filter each having a bit resolution equal to at least half of the maximum bit resolution; and

partitioning the plurality of E/N signals such that a first portion is processed by the first FIR filter, and a second portion comprised of bits having a

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data size greater than the bit width of the first FIR filter are processed by the second FIR filter.

These limitations, in combination with the remaining limitations of claim 19 are not taught nor suggested by the prior art of record.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance".

### ***Response to Arguments***

Applicant's arguments filed September 10, 2003 have been fully considered but they are not persuasive.

Concerning applicant's arguments:

1. Claim rejections – 35 USC 112
  - a. First paragraph: Concerning claims 16 and 17, both claims now have sufficient antecedent basis for control means. The 35 USC 112 rejection is withdrawn for both claims.
2. Claim rejections – 35 USC 103.
  - a. As per amended Claim 1 being unpatentable over Crochiere et al. (5664011), and further in view of Golla et al. (5724395):



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Crochiere describes an echo canceller (which would also cancel out near-end-crosstalk) comprising:

- 1) A first FIR filter (Fig. 2, reference 128)
- 4) A means to subtract the filtered output signal from the original input signal (Fig. 1 and Col. 3, paragraph 8).

However Cochiere does not mention:

- 2) A second FIR filter
- 3) Means to partition the input data signal such that a portion of the input signal is processed by each FIR filter and the second portion of processed data (processed by the second FIR) has a larger data size than the first portion of processed data (processed by the first FIR).

Golla teaches that using a single higher resolution filter requires more memory (which requires more power), and more integrated circuit space (Col 1, paragraph. 4-5). In order to help solve these problems Golla teaches the use of two smaller resolution FIR filters in which a data word is partitioned and a most-significant-bit portion is filtered by one FIR filter, and the remaining least-significant-bits are filtered by the second FIR filter (Fig. 3, Col.4, lines 49-58). Golla shows an additional embodiment of his teachings in which a second FIR filter 2 (Fig. 4) processes a second portion of the partitioned data signal (  $XM(n)$  ) comprising A0-A7 and B0-B7 that has a data size greater than the first portion of partitioned data (  $XL(n)$  ) that is processed by a first FIR filter (Col 4 lines 58-64). In view of Golla, it would have been obvious to one skilled in the art to apply Golla's solution when faced with the problems of higher resolution filters taking up too

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much space and drawing too much power, for the purpose of reducing the size and power draw of the circuitry. In view of Golla's solution applied to Cochiere's design it would have been obvious to add:

2) A second FIR filter

3) Means to partition the input data signal such that a portion of the input signal is processed by each FIR filter and the second portion of processed data (processed by the second FIR) has a larger data size than the first portion of processed data (processed by the first FIR).

**b. Regarding Claims 2-18:** Since Golla's teachings still read on the amended claim 1, it remains rejected. As such, Claims 2-18 remain rejected for the reasons specified in the office action mailed on 6-24-2003.

**c. As per Claims 13-15** being unpatentable over Crochiere et al. (5664011) and Golla et al. (5724395) as applied to claim 1, and further in view of Maulik et al. (6260053). Regarding **Claims 13-15:** Since Golla's teachings still read on the amended claim 1, it remains rejected. As such, Claims 13-15 remain rejected for the reasons specified in the office action mailed on 6-24-2003.

**d. As per Claim 18** being unpatentable over Crochiere et al. (5664011) and Golla et al. (5724395) as applied to claim 1, and further in view of Walker et al. (5570423). Regarding Claim 18: Since Golla's teachings still read on the amended claim 1, it remains rejected. As

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such, Claim 18 remains rejected for the reasons specified in the office action mailed on 6-24-2003.

### **Conclusion:**

**THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Alexander Jamal whose telephone number is 703-305-3433. The examiner can normally be reached on M-F 8AM-5PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Curtis A Kuntz can be reached on 703-305-4708. The fax phone numbers for the

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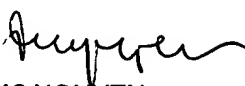
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organization where this application or proceeding is assigned are 703-872-9306 for regular communications and 703-872-9315 for After Final communications.

AJ

November 17, 2003

  
DUC NGUYEN  
PRIMARY EXAMINER